

WHAT IS CLAIMED IS:

1. A dispersion shifted fiber, wherein zero dispersion wavelength is on a wavelength side beyond 1640 nm, wavelength dispersion is -1.0 to -10.0 ps/nm/km in any wavelength in a wavelength range of 1530-1625 nm, dispersion slope is a positive value less than 0.07 ps/nm<sup>2</sup>/km, polarization mode dispersion at a wavelength of 1550 nm is not more than 0.1 ps/(km)<sup>1/2</sup>, and an effective core cross-sectional area at 1550 nm is 40-70  $\mu\text{m}^2$ .
- 10 2. The dispersion shifted fiber according to claim 1, wherein a transmission loss at the wavelength of 1550 nm is 0.200 dB/km.
- 15 3. The dispersion shifted fiber according to claim 2, wherein the transmission loss at the wavelength of 1383 nm is less than the transmission loss at the wavelength of 1310 nm, and an increase in the transmission loss at the wavelength of 1383 nm prior to and after hydrogen aging is not more than 0.04 dB/km.
- 20 4. The dispersion shifted fiber according to claim 3, wherein a cable cut off wavelength occurring at a length of 22 m is not more than 1300 nm.
- 25 5. The dispersion shifted fiber according to claim 1, comprising:  
a central core that surrounds an optical axis center, the central core having a first refractive index;

a second core that surrounds the central core, the second core having a second refractive index, the second refractive index being less than the first refractive index;

5 a third core that surrounds the second core, the third core having a third refractive index, the third refractive index being greater than the second refractive index; and

a clad that surrounds the third core, the clad having a fourth refractive index, the fourth refractive index being less than the third refractive index.

10

6. The dispersion shifted fiber according to claim 2, comprising:

a central core that surrounds an optical axis center, the central core having a first refractive index;

15 a second core that surrounds the central core, the second core having a second refractive index, the second refractive index being less than the first refractive index;

a third core that surrounds the second core, the third core having a third refractive index, the third refractive index being greater than the second refractive index; and

20 a clad that surrounds the third core, the clad having a fourth refractive index, the fourth refractive index being less than the third refractive index.

7. The dispersion shifted fiber according to claim 3, comprising:  
a central core that surrounds an optical axis center, the central  
core having a first refractive index;  
a second core that surrounds the central core, the second core  
5 having a second refractive index, the second refractive index being less  
than the first refractive index;  
a third core that surrounds the second core, the third core  
having a third refractive index, the third refractive index being greater  
than the second refractive index; and  
10 a clad that surrounds the third core, the clad having a fourth  
refractive index, the fourth refractive index being less than the third  
refractive index.

8. The dispersion shifted fiber according to claim 4, comprising:  
15 a central core that surrounds an optical axis center, the central  
core having a first refractive index;  
a second core that surrounds the central core, the second core  
having a second refractive index, the second refractive index being less  
than the first refractive index;  
20 a third core that surrounds the second core, the third core  
having a third refractive index, the third refractive index being greater  
than the second refractive index; and  
a clad that surrounds the third core, the clad having a fourth  
refractive index, the fourth refractive index being less than the third  
25 refractive index.

9. The dispersion shifted fiber according to claim 5, comprising:
  - a central core that surrounds an optical axis center, the central core having a first refractive index;
  - a second core that surrounds the central core, the second core having a second refractive index, the second refractive index being less than the first refractive index;
  - a third core that surrounds the second core, the third core having a third refractive index, the third refractive index being greater than the second refractive index; and
10. a clad that surrounds the third core, the clad having a fourth refractive index, the fourth refractive index being less than the third refractive index.

  

10. The dispersion shifted fiber according to claim 1, wherein relative index differences of the central core, the second core and the third core with respect to the clad are set as positive values.
11. The dispersion shifted fiber according to claim 2, wherein relative index differences of the central core, the second core and the third core with respect to the clad are set as positive values.
12. The dispersion shifted fiber according to claim 3, wherein relative index differences of the central core, the second core and the third core with respect to the clad are set as positive values.

13. The dispersion shifted fiber according to claim 4, wherein relative index differences of the central core, the second core and the third core with respect to the clad are set as positive values.

5 14. The dispersion shifted fiber according to claim 5, wherein relative index differences of the central core, the second core and the third core with respect to the clad are set as positive values.